



CCU

The Combined Cleaning Unit Eliminator™



Fig. 1. The Combined Cleaning Unit (CCU) Eliminator™.

The CCU is an optimized lube oil treatment solution, combining two high performance Alfa Laval technologies:

- Full-flow automatic filter for collecting abrasive particles.
- High efficiency disc stack centrifuge removing stopped particles from the backflush oil arriving from the full-flow chamber of the automatic filter, before that oil is returned to the sump. Also cleaning the oil of small deposit-creating particles.

Both components can be built into the same housing (Eliminator™ patented by Alfa Laval) or installed separately but operating in combination. For example:

- Mounted directly on the engine (for high speed engines), the housing being specifically designed for the engine block, and the unit promoted with the engine by the engine manufacturer.
- Remote mounted apart from the engine by means of flexible or rigid connexions.
- The filter and centrifuge installed as separate components for larger installations or where the flow-rates are higher, and connected by suitable pipework.

Advantages and benefits

- Eliminates full-flow and bypass cartridge filters, and all the costs associated with the cartridge filters: purchasing, transport, handling, stocking, administration, oil losses, disposal of used cartridges.
- Increased engine availability
 - no engine stop for filter cartridge change.
- No filter bypass – the engine has 100% protection. In case of failure of one engine component, the remaining engine parts are protected from any resulting contamination returning through the LO system, by the full flow filter.
- Sealed lube oil circuit – the lube oil circuit remains sealed: no risk of contamination entering the system, or of oil leakage and spillage occurring.
- Reduced maintenance costs.
 - The centrifuge requires cleaning up to every 2500 hours by the replacement of a paper insert.



– The filter requiring service during the normal engine service interval and overhaul. At this time only a set of O-rings are required and 3–4 hours for the complete operation of disassembly, inspection/cleaning and refitting.

Our experience with some high-speed engine-builder customers has shown that it is possible to double the lifetime of the lube oil, through close oil sample analysis.

- Increased oil life-time – the high efficiency of the centrifuge compared to cartridges, keeps the lube oil cleaner, hence increasing its operational life.

- Environmentally-friendly solution due to no oil loss, no cartridge disposal, reduced risk of oil spillage and the possible extended operating life of the engine lube oil.

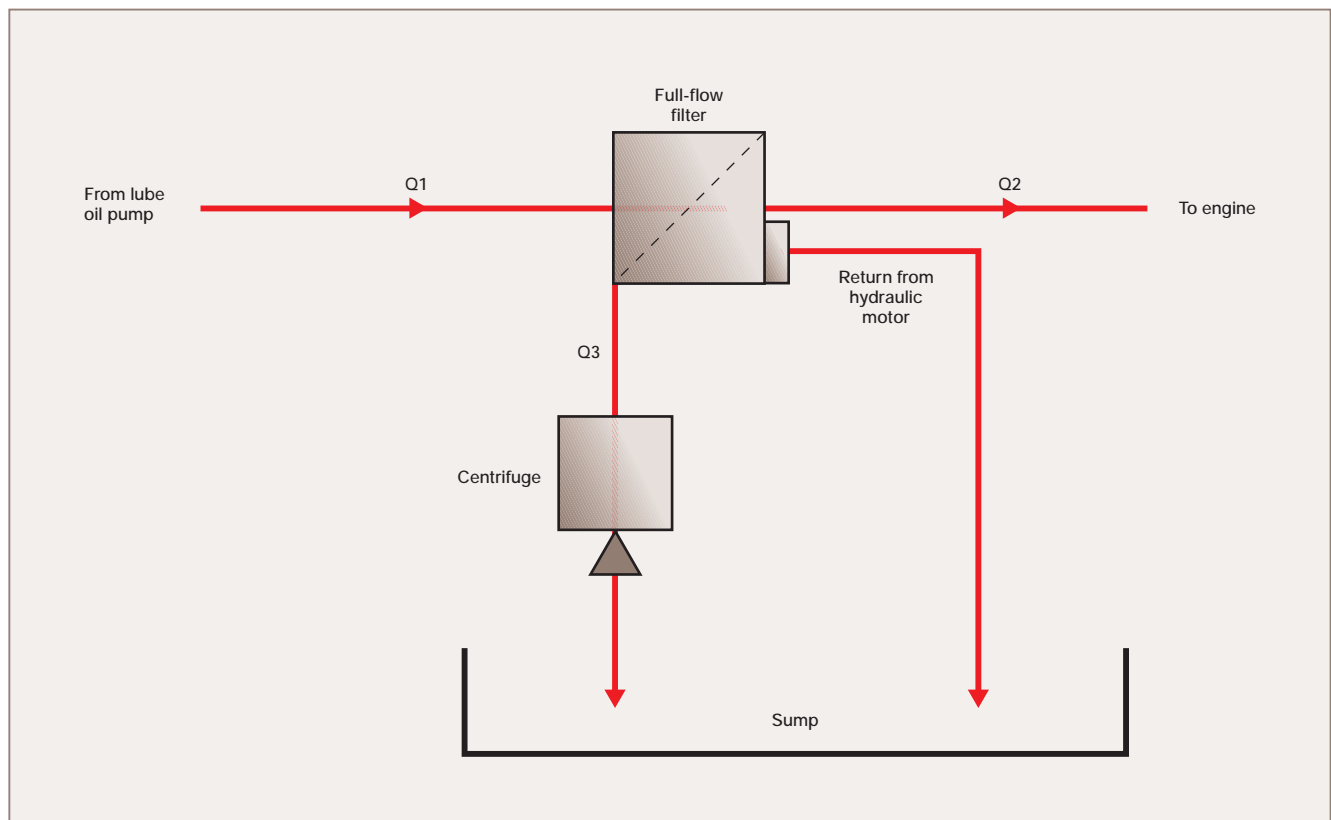


Fig. 2. Flow diagram of the CCU concept.

Full-flow automatic filter (A)

The automatic filter is made up of a number of filter disc elements, each element composed of two identical halves. The number of elements required is defined to meet each application.

The stainless steel filtering mesh is contained inside two supporting mesh, giving an element with a long operating life-time. This is one key part to the low life-cycle cost of the unit.

The rigid frame of each element is made in die-cast aluminium. This frame has a number of radial ribs separating each element into 8 or 12 sectors depending on the element size.

The oil passes through the element from the inside to outside, via the holes on the inside edge of the element. The particles are stopped and are trapped on the mesh.

The elements are stacked on top of each other, and hence the ribs form a collection of independent sectors or columns.

A rotating distributor set inside the disc stack assures the backflushing of each sector in turn by clean oil and is driven by a hydraulic motor (B). This motor

itself is driven by oil pressure and slowly rotates the distributor one rotation every 90–120 seconds, ensuring the complete and continuous backflushing of the filtering surface area.

The rate of backflushing flow is regulated by the centrifuge, which also acts to restrict the amount of backflush flow to 3–5% of the LO flow-rate.

Centrifuge (C)

The centrifuge is made up of a rotor (or bowl) spinning on a shaft, driven by the pressure of oil which is forced from two nozzles which are at 180° positions around the body. This rotation is achieved due to the pressure difference from the inlet to outlet sides of the centrifuge.

The rotor contains an Alfa Laval disc stack which enhances the performance of the centrifuge by between 6–8 times compared to a similar centrifuge with no discs.

Particles down to 2 µm and below in size are retained on the rotor wall, when the relative specific density of the particles to that of the oil allows. A paper insert allows for simple removal of the contaminants collected on the wall of the centrifuge rotor.

The combined filter and centrifuge product

The full-flow filter and the centrifuge can be installed in combination in a shared housing (as shown below), the backflush flow of the filter feeding the centrifuge, where it is cleaned prior to returning to the engine sump.

Depending on the engine, the CCU housing can be adapted for direct engine-mounting in place of the existing filters, or installed separately from the engine itself and connected through suitable pipework.

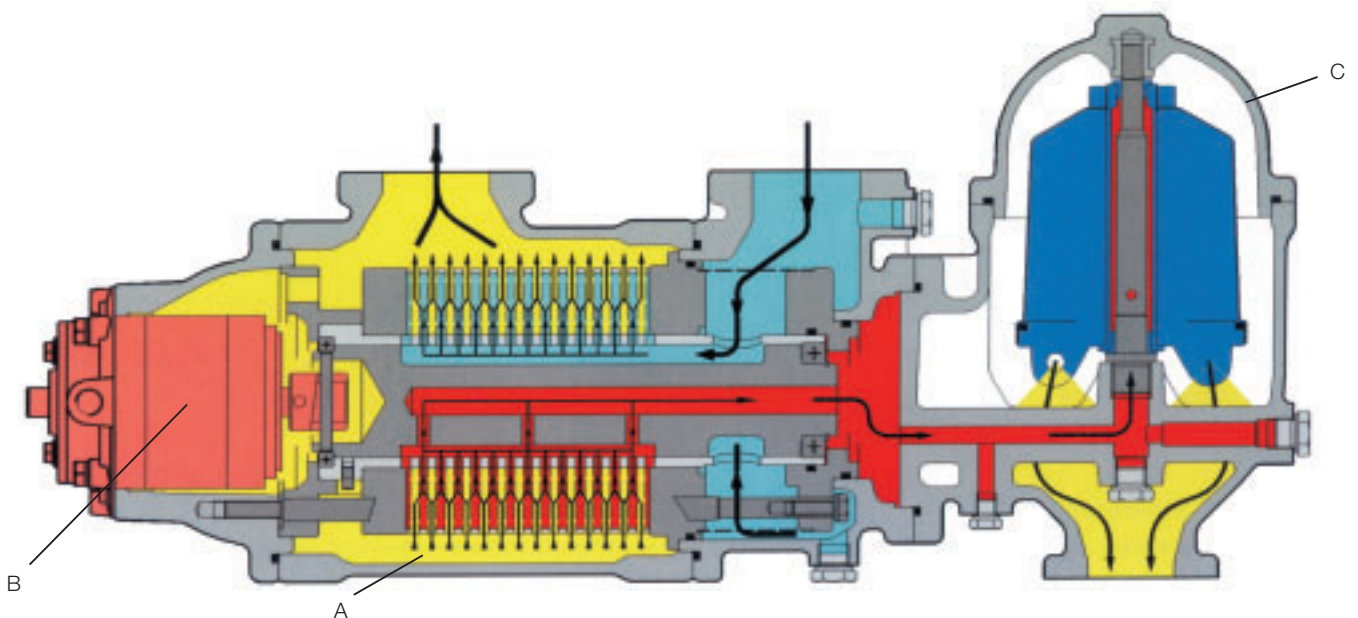


Fig. 3. The Eliminator™ Filter.



Fig. 4. Filter only without centrifuge.

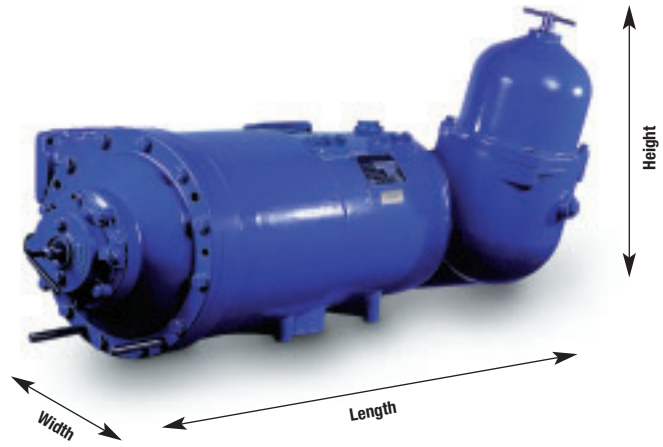


Fig. 5. Filter with centrifuge CCU.

Product range

Model	Q m ³ /h	Fig. 4	Fig. 5
		H x L x W (mm)	L x W x H (mm)
180-8	to 16	540 x 250 x 290	–
180-14	to 30	610 x 250 x 290	880 x 250 x 390
180-20	to 40	680 x 250 x 290	950 x 250 x 390
240-18	to 50	710 x 340 x 355	990 x 340 x 420
240-24	to 70	880 x 340 x 355	1070 x 340 x 420
240-30	to 90	960 x 340 x 355	1160 x 340 x 420

Applications

All models available as

- filter only
- filter combined with centrifuge Eliminator™.

Products suitable for Lube Oil treatment for engines burning HFO, DO, distillate or gas fuels. Suitable for retro-fit installation.

Technical documentation

Complete information and documentation for the main components and the installation, operation and maintenance of the filter is contained in the Instruction Book that accompanies delivery of each Alfa Laval filter. Your local Alfa Laval company will be able to provide more details on the application and sizing of Alfa Laval Automatic Filters.

Technical data

Data	Value
Max. filter inlet pressure	12 bar
Min. filter outlet pressure	3 bar
Normal filter outlet pressure	3.5–6 bar
Counter pressure in “return to sump”	0.5 bar max. when filter only No counter pressure allowed on CCU
Max. viscosity in the filter at normal operation	75 cSt
Max. continuous temperature in the filter	120°C
Normal ΔP (inlet to outlet)	0.2–0.5 bar
Alarm ΔP	0.8 bar
Back-flushing flow (% of pump capacity)	3–5%
Mounting position	
– filter only	Vertical or horizontal
– CCU	Horizontal
Test pressure	18 bar
Standard housing material	Aluminium

How to contact Alfa Laval

Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information direct.